

## Claims

- Sub B1
1. A composition comprising an effective amount of an extract or compound obtained from the plant *Glycyrrhiza glabra* and useful as a bio-enhancer and bioavailability facilitator together with a therapeutically effective amount of one or more nutraceuticals, antibiotics, anti-infective agents and anti-cancer agents.
  2. A composition as claimed in claim 1 containing an extract from the leaves, stem, roots or stolon of *Glycyrrhiza glabra*, glycyrrhizic acid or glycyrrhizin, or a combination thereof.
  3. A composition as claimed in claim 1 wherein glycyrrhizin and glycyrrhizic acid are obtained from the plant *Glycyrrhiza glabra*.
  4. A composition as claimed in claim 1 wherein the extract from the roots of *Glycyrrhiza glabra* is licorice.
  5. A composition as claimed in claim 1 wherein the anti-infective agents are selected from anti-bacterial, anti-fungal and anti-tuberculosis agents.
  6. A composition as claimed in claim 1 wherein the concentration of glycyrrhizin ranges from 0.05 to 50% of the weight of the anti-bacterial compounds.
  7. A composition as claimed in claim 1 wherein the concentration of glycyrrhizin ranges from 0.10 to 10% of the weight of the nutraceutical compounds.
  8. A composition as claimed in claim 1 wherein the concentration of glycyrrhizin ranges from 0.25 to 20% of the weight of the anti-fungal agents.
  9. A composition as claimed in claim 5 wherein the anti-bacterial agents are selected from the group comprising  $\beta$ -lactams, macrolides, quinolones, fluoro-quinolones, aminoglycosides, glycopeptides, rifamycins, folate inhibitors, tetracyclines, anti-tuberculosis agents and microbicidal compounds.
  10. A composition as claimed in claim 9 wherein the quinolones and fluoro-quinolones are selected from the group consisting of nalidixic acid, norfloxacin, ciprofloxacin, sparfloxacin and similar other compounds.
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11. A composition as claimed in ~~claim 9~~ wherein the  $\beta$ -Lactams are selected from the group comprising penicillin, flucloxacillin, cloxacillin, methicillin, cephalosporins and carbapenems.
12. A composition as claimed in claim 9 wherein the macrolides are selected from erythromycin, clarithromycin, azithromycin and other similar compounds.
13. A composition as claimed in claim 9 wherein the aminoglycosides are selected from the group consisting of streptomycin, gentamicin, amikacin and similar compounds.
14. A composition as claimed in claim 9 wherein the glycopeptides are selected from vancomycin, teicoplanin and other similar compounds.
15. A composition as claimed in claim 9 wherein the rifamycins are rifampicin and similar compounds.
16. A composition as claimed in ~~claim 9~~ wherein the folate inhibitors are selected from trimethoprim, sulphonamides and other similar compounds.
17. A composition as claimed in ~~claim 9~~ wherein the microbiocidal compounds are selected from streptogramins and oxazolidinones.
18. A composition as claimed in ~~claim 5~~ wherein the anti-tuberculosis agents are selected from the group comprising isoniazid, pyrazinamide, ethambutol and other similar compounds.
19. A composition as claimed in claim 5 wherein the anti-fungal agents are selected from the group consisting of polyene, triazole, imidazole, clotrimazole and other fungicidal compounds.
20. A composition as claimed in claim 19 wherein the polyene is selected from amphotericin B, nystatin and other similar compounds.
21. A composition as claimed in ~~claim 19~~ wherein the triazole is selected from fluconazole, itraconazole and other similar compounds.
22. A composition as claimed in ~~claim 19~~ wherein the imidazole is selected from ketoconazole and other similar compounds.
23. A composition as claimed in claim 19 wherein the fungicidal compound is selected from griseofulvin and terbinafine.

24. A composition as claimed in claim 1 wherein the anti-cancer agent is selected from the group consisting of Paclitaxel (Taxol), Docetaxel (Taxotere), Vinblastine (Velban), Vincristine (Oncovin) and Vinorelbine (Navelbine).

25. A composition as claimed in claim 1 wherein the concentration of glycyrrhizin ranges from 10 to 10,000 folds of the weight of the anti-cancer compound.

26. A composition as claimed in claim 1 wherein the nutraceutical compounds are selected from the group consisting of vitamins, amino acids, hormones and other nutritional supplements.

*Sur B2* 27. A composition as claimed in claim 1 wherein licorice preparation or dried root is given as one gram equivalent to 40 mg of glycyrrhizin.

28. A method for enhancing the bio-availability of herbal extracts, anti-infective agents, anti-cancer and nutraceutical compounds/compositions across biological membranes in living systems; said method comprising the steps of administering to a subject in need thereof, a composition comprising an effective amount of the bioenhancer obtained from the plant *Glycyrrhiza glabra*, and any one of anti-infective agents, anti-cancer agents and nutraceutical compounds.

29. A method as claimed in claim 28 wherein the bio-enhancer is selected from the extract of *Glycyrrhiza glabra*, glycyrrhizin, glycyrrhizic acid obtained from *Glycyrrhiza glabra* or combinations thereof.

30. A method as claimed in claim 28 wherein the bioenhancer is obtained from the roots, stem, stolon or leaves of the plant *Glycyrrhiza glabra*.

31. A method as claimed in claim 28 wherein the anti-infective agents are selected from anti-bacterial, anti-fungal, and anti-cancer agents.

32. A method as claimed in claim 31 wherein the anti-bacterial agents are selected from the group comprising  $\beta$ -lactams, macrolides, quinolones, fluoro-quinolones, aminoglycosides, glycopeptides, rifamycins, folate inhibitors, tetracyclines, anti-tuberculosis agents and microbicidal compounds.

33. A method as claimed in claim 31 wherein concentration of glycyrrhizin ranges from 0.05 to 50% the weight of the anti-bacterial agents.

34. A method as claimed in claim 32 wherein the quinolones and fluoroquinolones are selected from the group consisting of nalidixic acid, norfloxacin, ciprofloxacin, sparfloxacin and similar other compounds.
35. A method as claimed in claim 32 wherein the  $\beta$ -Lactams are selected from the group comprising penicillin, flucloxacillin, cloxacillin, methicillin, cephalosporins and carbapenems.
36. A method as claimed in claim 32 wherein the macrolides are selected from erythromycin, clarithromycin, azithromycin and other similar compounds.
37. A method as claimed in claim 32 wherein the aminoglycosides are selected from the group consisting of streptomycin, gentamicin, amikacin and similar compounds.
38. A method as claimed in claim 32 wherein the glycopeptides are selected from vancomycin, teicoplanin and other similar compounds.
39. A method as claimed in claim 32 wherein the rifamycins are rifampicin and their similar compounds.
40. A method as claimed in claim 32 wherein the anti-tuberculosis agents selected from the group comprising isoniazid, pyrazinamide, ethambutol and other similar compounds.
41. A method as claimed in claim 31 wherein concentration of glycyrrhizin ranges from 0.25 to 20% the weight of the anti-fungal agents.
42. A method as claimed in claim 31 wherein the anti-fungal agent is selected from the group consisting of polyene, triazole, imidazole, clotrimazole and other fungicidal compounds.
43. A method as claimed in claim 28 wherein the anti-cancerous agent is selected from the group consisting of Paclitaxel (Taxol), Docetaxel (Taxotere), Vinblastine (Velban), Vincristine (Oncovin) and Vinorelbine (Navelbine).
44. A method as claimed in claim 31 wherein the concentration of glycyrrhizin ranges from 10 to 10,000 folds of the weight of the anti-cancer agent.
45. A method as claimed in claim 28 wherein the nutraceutical compounds are selected from the group consisting of vitamins, amino acids, hormones and other nutritional supplements.

46. A method as claimed in claim 27 wherein administration of the composition circumvents the side effects of chemotherapy by substantially reducing the dosages of therapeutic agents comprising of anti-bacterial, anti-fungal and anti-cancerous agents wherein the side effects of those agents can be bone marrow suppression, liver and kidney toxicity, pulmonary scarring, high fevers, skin reactions, Nausea and vomiting, hair loss, skin rash, mouth sores, diarrhoea, loss of appetite and confusion, lethargy and ambulation problems (ataxia), anaphylactic reactions (consisting of fast heart rate, wheezing, lowered blood pressure and facial edema, cerebellar dysfunction (consists of slurring of speech, walking problems, as well as eye motion problems), loss of periods (menses), ovarian failure can occur, painful soft tissue ulcers, cardiotoxicity, hypersensitivity reactions, abnormal blood pressure, sweating, bleeding, shortness of breath and many related problems
47. A method as claimed in claim 27 wherein, the bioenhancer improves the uptake of anti-infectives, anticancer agents and other molecules when glycyrrhizin is provided prior to the treatment with these molecules.
48. Use of the extract or the compound obtained from the plant *Glycyrrhiza glabra*, as a bioenhancer and bioavailability and facilitator of nutritional compounds and drugs and molecules selected from anti-infective and anti-cancer agents.